

# Utility Patent Application

## CONFIDENTIAL INFORMATION

Patent Application based on: Docket No. 01-432  
Inventor: Andy T. Zupan  
Attorney: John D. Gugliotta, P.E., Esq.

## PORTABLE, MULTIPURPOSE, AIR DISPENSING APPARATUS

## RELATED APPLICATIONS AND DISCLOSURES

The present invention is a Continuation in Part of U.S. Application  
09/264,699, filed on 03/08/99.

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The present invention relates generally to air tanks, and, more particularly,  
to a portable, multipurpose, air dispensing apparatus.

### 2. Description of the Related Art

High intensity sports, exercises and other recreational activities are

extremely popular these days. Whether one is involved in a traditional sports such as football or basketball, in high intensity exercises such as aerobics or running, or in a more modern or extreme sports like in-line skating, mountain biking and water sports, a high degree of physical exertion takes place.

5 As a result of these activities, the body can be depleted of oxygen as the cardiovascular system is pressed to keep up with the level of physical exertion. Accordingly, there is a constant need for exercise or health aids that help the user to reduce the physical impact that their activities have on their bodies and allow them to recover quickly so that they can participate in yet more activities.

10 Any type of portable oxygen or air dispenser must be portable, and therefore, not interfere with the activities of the potential user. Also, the device must be stored in a place where it can be easily found and used, since the device may be needed during an emergency situation, such as during drowning, where the person may be partially mentally impaired.

15 In the related art, several devices disclose portable, self-contained oxygen dispensers or breathing apparatuses. These include U.S. Patent no. 5,620,664, issued in the name of Palmer, U.S. Patent no. 4,409,978, issued in the name of Bartos, U.S. Patent no. 4,154,236, issued in the name of Eckstein et. al., U.S. Patent no. D 372,529, issued in the name of Remes and U.S. Patent no.

D297,869, issued in the name of Bartos.

Several patents describe an emergency escape breathing apparatus.

These include U.S. Patent no. 5,318,019, issued in the name of Celaya and U.S.

Patent no. 4,221,216, issued in the name of Kranz.

5 U.S. Patent no. 4,669,461, issued in the name of Battaglia et. al.,  
discloses a device for administering oxygen to infants while nursing.

U.S. Patent no. 4,423,723, issued in the name of Winkler et. al., discloses  
a closed-cycle respirator with an emergency oxygen supply.

10 U.S. Patent no. D 311,679, issued in the name of Morris, discloses the  
ornamental design of a holder for an oxygenator bottle.

The problem with many of these devices is that they are bulky, and are  
therefore, limited in use. Also, the devices are not specifically designed for use  
during non sporting activities, and are not portable enough to be carried in a  
purse or pocket. As such, executives needing oxygen before a speech, etc. are  
15 not contemplated by the prior art devices. The devices in the prior art have  
numerous components, and as such, are subject to component failure. These  
devices are also heavy, which reduces portability.

Many of the devices are designed to function only in oxygen deprived  
atmospheres, and as such must be bulky and heavy. They do not contemplate

supplemental or complementary air supplies during non-emergency situations, such as when only one or two breaths are needed.

Also, not all of these devices are designed to release just one breath of air at a time.

5 A search of the prior art did not disclose any patents that anticipate directly many features of the instant invention.

Consequently, a need has been felt for providing an apparatus and method which overcomes the problems cited above.

#### 10 SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide an improved portable, multipurpose, air dispensing apparatus that is easily stored and activated to provide a short term supplemental air supply.

15 Briefly described according to one embodiment of the present invention, a portable, multipurpose, air dispensing apparatus is disclosed, comprising a small, portable canister that holds a combination of compressed oxygen and nitrogen that the user can tap in order to recuperate from the physical exertion by delivering these gasses to the cardiovascular system in a quick and efficient manner. The canister includes a mouthpiece/regulator combination that the user

places in his or her mouth and, by depressing a button, a breath of the pure oxygen/nitrogen is delivered. The canister is disposable and replaceable and holds enough gas for approximately 15-90 average breaths, depending on exact canister size and PSI rating. Carried in a convenient arm wrap, the canister gives the user the ability to tap the benefits of the gasses whenever the need is felt. Additionally, the present invention serves a safety purpose in high-altitude sports where the air is thin and oxygen supplies are low.

It is another object of the present invention to provide a device that can provide supplemental oxygen during events such as rafting, swimming, surfing, boating, skiing, sky diving, hang gliding, life guarding, in line skating, mountain biking, jogging, business functions, such as speeches.

It is another object of the present invention to provide a device that can be stored in a pocket, and therefore can be used in public, when required.

It is another object of the present invention to provide a device that adjustably fits around a user's arm or leg, thus ensuring quick access to the device during emergency situations.

DESCRIPTIVE KEY

	10	portable, multipurpose, air dispensing apparatus	66	outer chamber
5	20	canister	67	conduit
	30	regulator	68	valve housing
	40	mouthpiece	69	flexible tube
	45	mouth	70	female threads
	50	activation button	71	piston
10	51	threaded shank	72	lever arm
	52	constant volume discharge valve	73	pivot mound
	53	seat member	75	male threads
	54	annular seat	80	sealing means
15	55	thumb	83	puncture stem
	56	ball	90	canister securing means
	57	hand	100	arm
	58	metal seat	110	arm wrap
	59	spring	120	arm wrap securement means
20	60	female inlet	125	interior surface
	61	metal pin	130	nonslip surface
	62	valve arm	140	canister pouch
	63	coil spring	150	flap
	64	chamber	153	opening
25	65	orifice passageway	160	flap securement means
			165	flap

BRIEF DESCRIPTION OF THE DRAWINGS

The advantages and features of the present invention will become better  
30 understood with reference to the following more detailed description and claims  
taken in conjunction with the accompanying drawings, in which like elements are  
identified with like symbols, and in which:

FIG. 1 is a perspective view of the preferred embodiment of portable,  
multipurpose, air dispensing apparatus 10;

FIG. 2 is a side view thereof;

FIG. 3 is a top plan view thereof;

FIG. 4 is an in-use view thereof;

FIG. 5 is an exploded view thereof;

FIG. 6 is a bottom view thereof;

FIG. 7 is a perspective view of the canister securement means;

FIG. 8 is a perspective view of the canister securement means shown in-  
use with a human arm;

Fig. 9 is an in-use view of another embodiment of the canister securement  
means;

FIG. 10 is a cross-sectional view as taken along lines X-X of FIG. 2; and,

FIG. 11 is a sectional view of the constant volume discharge valve  
according to the preferred embodiment of the present invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

The best mode for carrying out the invention is presented in terms of its  
preferred embodiment, herein depicted within the Figures 1 through 8.

## 1. Detailed Description of the Figures

Referring now to FIG. 1, a portable, multipurpose, air dispensing apparatus 10 is shown, according to the present invention, comprises a small, portable canister 20 that holds a combination of compressed oxygen and nitrogen.

The canister 20 is of a linearly elongated, cylindrical, hollow configuration, and is constructed of a lightweight metal, such as aluminum or steel.

The present invention is designed to be used to facilitate speedy recuperation from the physical exertion by delivering these gasses to the cardiovascular system in a quick and efficient manner. It is envisioned that the canister holds enough gas for approximately 15 average breaths.

Referring now to FIG. 2, located on the top of the canister is a regulator 30, and above the regulator 30, a mouthpiece 40, over which the user places in his or her mouth 45 (not shown in FIG. 2).

Referring now to FIGS. 3 and 4, an activation button 50 is located on the top of the regulator 30. By depressing the activation button 50, the regulator 30 releases the equivalent of one breath of the oxygen nitrogen mixture through the mouthpiece 40 and into the mouth 45 (not shown in FIG. 3) of the user.

A constant volume discharge valve 52 (shown in FIG. 11) is located inside



a valve housing 68 of the regulator 30. The valve housing 68 is formed of metal having the constant volume discharge valve 52 machined therein. A threaded shank 69 for capturing a piston 71 and its essential components is threadably received in the valve housing 68. The discharge valve 52 includes a biased valve closure member defined by the piston 71 having a supply and sealing seat member 53 engaging an annular seat 54.

The discharge valve 52 further includes a ball 56 for engaging a hard metal seat 58 for acting as a pressure control means. The ball 56 is biased in a closed position by internal pressure of the canister 20 and a resilient spring 59. The hard metal seat 58 prevents a sealing seat from being achieved. As the supply pressure of the oxygen nitrogen mixture decreases, the ball 56 is lifted from the hard metal seat 58 by a metal pin 61 being resiliently biased through a valve arm 62 and a resilient coil spring 63. The valve arm 62 thereby functions as a pressure regulator for maintaining a substantially constant pressure within a chamber 64.

The valve arm 62 has a fixed diameter orifice passageway 65 communicating from the chamber 64 to an outer chamber 66 thereby providing open communication through a conduit 67 and a flexible tube 69 to the puncture stem 83 (not shown). The valve arm 62 is actuated by a lever arm 72 resting

above a pivot mound 73 and being coupled at one end to the valve arm 62 and at an opposite end to the lower surface of the activation button 50. Pressure exerted on the activation button 50 actuates the lever arm 72 to pivot about the mound 73 thereby lifting the lever arm 72 for releasing a preset amount of the oxygen nitrogen mixture.

The valve arm 62 thus further functions to release a preset amount of the oxygen nitrogen mixture equivalent to one human breath, each time the activation button 50 is depressed.

The present invention is configured and designed for activation via a human thumb 55 (not shown in FIG. 3). The size and configuration of the present invention allows holding and activation of the canister 20 with only one hand 57.

It is envisioned that the canister 20 is sufficiently small so as to be portable, capable of easy grasping, holding and activation with one hand 57, and capable of being carried in a pocket. As such, the present invention can be used anywhere it is needed. For purposes of disclosure, the canister 20 is depicted as being 1 inch in radial diameter, and 3 and ½ inches in height. This configuration

allows for optimal usage, while other sizes are also envisioned. The canister 20 size can range from 5 and ½ inches to 15 inches, depending on the needs of the user.

It is envisioned that the simple configuration ensures fewer component failures. The small, lightweight design ensures ease of use anywhere during any activity.

Referring now to FIG. 5, the regulator 30 is attached to the top of the canister 20 via a female inlet 60 and female threads 70 , located on the bottom of the regulator 30. These female threads mate with male threads 75 located on the top of the canister. Sealing means 80, such as an O-ring, ensure an air tight seal between the regulator 30 and the canister 20. A conventional puncture stem 83 on the top of the canister 20 allows air to be dispensed from the canister 20 once attached to the regulator 30.

As such, the canister 20 is releasably secured to the regulator 30 and thereby the mouthpiece 40. Being disposable, the canister 20 can be replaced when depleted.

Referring now to FIGS. 7 and 8, the present invention is releasably secured to the body of the user via a convenient canister securement means 90. The canister securement means 90 is designed to releasably secure the canister

20 to the arm 100 or leg of the user, within easy grasp of the user. The canister securement means 90 eliminates the need to search for the canister 20, especially during times where time is of the essence, or mental functioning is impaired, such as during emergencies involving water.

5 For purposes of disclosure, the canister securement means 90 is depicted as an adjustable arm wrap 110, of a generally rectangular configuration. The arm wrap 110 is constructed of a strong, lightweight, elastic material, such as neoprene or cloth. The arm wrap 110 is wrapped around the arm 100 of the user, and adjustably secured via arm wrap securement means 120, such as a hook and loop fastener. The interior surface 125 of the arm wrap 110, which rests against the arm 100 of the user, contains a non-slip surface to reduce movement of the arm wrap 110 along the arm 100 during activity.

10 A canister pouch 140 is located on the exterior surface of the arm wrap 110. The canister pouch 140 is configured and sized so as to snugly hold the canister 20 within itself. When the canister 20 is in the canister pouch 140 and the canister pouch 140 secured to the user's arm 100, the elongated centerline of the canister 20 is parallel to the elongated centerline of the arm 100, so as to facilitate easy grasping by the opposite arm 100 when needed.

15 It is also envisioned that a flap 150 is attached to the exterior surface of

the arm wrap 110, and covers the opening 153 in the canister pouch 140. The flap 150 is releasably secured against the exterior surface of the canister pouch 140 via flap securement means 160, such as a hook and loop fastener or a snap fastener. The flap securement means 160 is designed to be easily and quickly disconnected to allow easy access to the canister 20.

The canister pouch 140 does not completely cover the canister 20 once inserted, so that when the flap 150 is released, the canister 20 can be easily grasped by the top. For intense activities, the canister pouch 140 may be altered so that the canister 20 fits completely inside the canister pouch 140, like a knife in a sheath.

Referring now to FIG. 9, in an alternate embodiment of the present invention, the canister 20 is releasably secured to the exterior surface of the arm wrap 110 via a flap 165 and flap securement means 160. The canister pouch 140 is not included.

The present invention is designed to be used during all water activities as well as when the air is thin, such as during sky diving or mountain climbing. The portable nature also facilitates use during everyday activities, such as when a person is nervous giving a speech, where the canister 20 can be stored in a purse or pocket.

The present invention is also designed to serve as an emergency air supply for those who use oxygen on a long term basis, such as asthmatics. The present invention may be used as a temporary air supply, and as such, would be useful in first aid kits, extinguisher compartments, and the like.

5 As such, it is envisioned that the present invention can be used to provide supplemental oxygen during events such as rafting, swimming, surfing, boating, skiing, sky diving, hang gliding, life guarding, in line skating, mountain biking, jogging, and during business functions, such as speeches.

10 In an alternate embodiment of the present invention, the mouthpiece 40 and regulator 30 are permanently affixed to the pre-filled canister 20, and as such, the entire device is disposable when the canister 20 is depleted. This reduces the need to store the device after use.

15 It is envisioned that other styles and configurations of the present invention can be easily incorporated into the teachings of the present invention, and only one particular configuration shall be shown and described for purposes of clarity and disclosure and not by way of limitation of scope.

## 2. Operation of the Preferred Embodiment

Referring now to FIG. 6, to use the present invention, the canister 20 is

secured to the person's arm 100 or leg via the canister securement means 90.

When air is needed, the user releases the flap securement means 160, grabs

the canister 20 with any free hand 57 and places the mouthpiece 40 against his

or her mouth 45. Next, the user places his thumb 55, from the hand 57 holding

the canister 20, onto the top of the canister 20 and depresses the activation

button 50. A supply of air equivalent to one breath of air enters the user's mouth

45. Each time a breath is needed, the activation button 50 is depressed. In the

preferred embodiment, when the canister 20 is depleted of oxygen, the canister

20 can be unscrewed from the regulator 30, and replaced. In the alternate

embodiment, the entire device is discarded.

The foregoing description is included to illustrate the operation of the preferred embodiment and is not meant to limit the scope of the invention. The scope of the invention is to be limited only by the following claims.